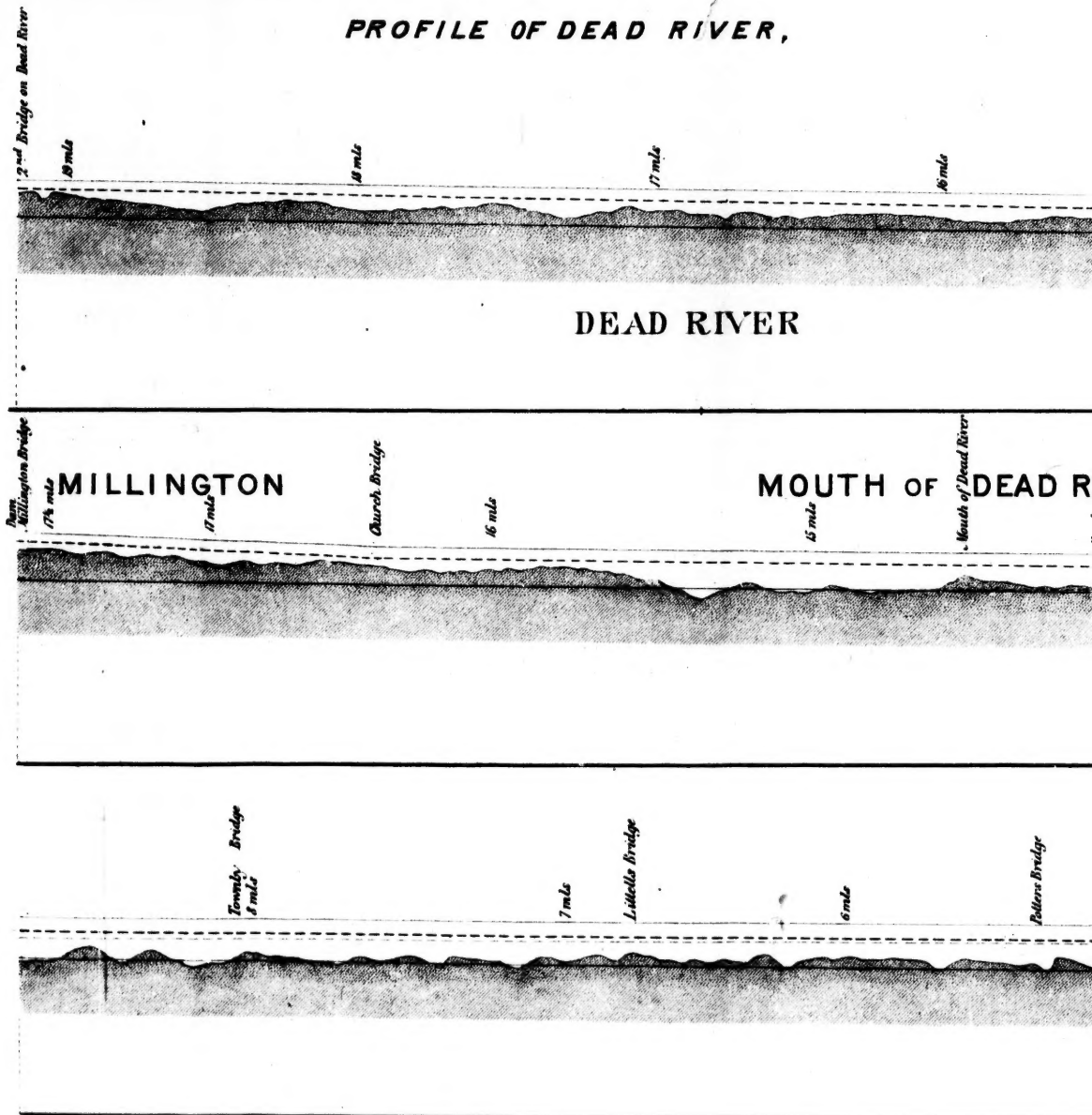


PROFILE OF DEAD RIVER,




40 mile

45 mile

Mouth of Dead River

H OF DEAD RIVER.

Smallville Bridge
2 1/2 mile



PASSAIC RIVER.

NEW PROVIDENCE.

Patterson Bridge

5 mile


8 mile

Thunder Bridge

3 mile

2 mile

Patterson Bridge



PASSAIC RIVER.

PROFILE OF DEAD RIVER,

PROFILE

FROM

DEAD RIVER

INGTON

MOUTH OF DEAD RIVER.

PASSAIC RIVER.

NEW PROVIDENCE.

PASSAIC RIVER.

GEOLOGICAL SURVEY OF NEW JERSEY.

PROFILE OF THE PASSAIC RIVER,

FROM CHATHAM TO MILLIN TON.

GEO. H. COOK,

State Geologist.

ED. A. BOWSER,

Surveyor.

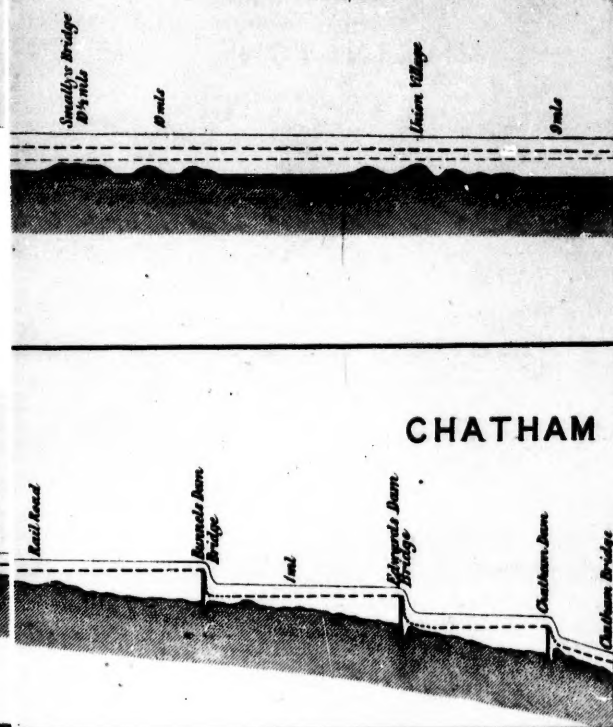
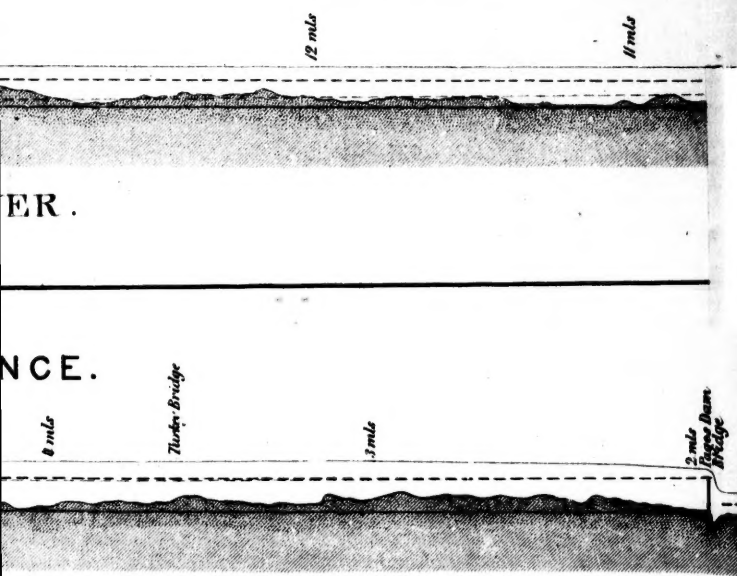
Scale.

Horizontal: 2 inches to 1 mile.

Vertical: 40 feet to 1 inch.

Explanation of lines on the profiles in the order of their succession.

- High water April 5, 1870.
- - - - - do do 2^d, 1870.
- Level of top of Paves dam.
- Grade line, 8 inches per mile.
- Bed of the Stream.
- Level of dam at Little Falls.



APPENDIX A.

Report of Levels and Soundings taken on the Passaic River from
Chatham to Millington Bridge, and also on Dead
River, by Prof. Ed. A. Bowser.

A line of levels was run from Chatham Bridge to Millington Bridge, and also on Dead River as far as the second bridge from its mouth. From these levels the heights of the benches were determined at all the intervening bridges. The heights along the surface of the water were found by leveling from these benches. The heights along the *bottom* were determined by sounding in the channels of the rivers, and subtracting the depths from the heights of the surface. In the accompanying profiles, the top of Beatty's Dam, at Little Falls, is the datum plane. The heights of the points, both along the surface and the bottom of the rivers, were measured from this plane.

It will be seen, by a careful examination of this profile:

1st. That the bed of the Passaic from Chatham Bridge to Page's Dam, has a rise of twenty feet, while each dam, viz: the first just above Chatham Bridge, the second, Edward's, and the third, Bunnell's, backs the water up to the dam next above it.

2d. That the bed of the river from Page's Dam to Smally's Bridge, distant eight miles, following the course of the channel, has a rise of six feet, while the bed of the river at Smally's Bridge is two feet *lower* than the top of Page's Dam.

3d. That the bed of the river from Smally's Bridge to the mouth of Dead River rises five feet; from the mouth of Dead River to the bridge opposite the Church, two feet; from the Church Bridge to Millington Bridge, five feet. On Dead River, from its mouth to the second bridge three miles up, it rises eight feet.

We see then that while the river, from Page's Dam down to Chatham Bridge, has a sufficient fall, Page's Dam must back the water up to the mouth of Dead River. So that an ordinary rain, when the mill-pond is full, will flood the Passaic Valley from the dam to the mouth of the Dead River.

By the "New Formula," deduced and used by the Hydrographical party, in their investigations on the Mississippi, a fall of eight inches per mile, in a stream the size of the Passaic above Chatham, will give it a velocity of about one and a half feet per second. This fall can be obtained by cutting Page's Dam down eight and seven-tenths feet, which will make the grade line at the dam thirty-seven seven-tenths feet above the datum plane. This grade line prolonged will strike Bunnell's dam two feet below the top, or thirty-seven feet above the datum plane. Bunnell's Dam, therefore, will require cutting down two feet.

The grade line between Page's Dam and Turkey Bridge, as the profile indicates, is from two to three feet below the bed of the channel, and about half a mile above Page's Dam it is five feet below the bed, and the bottom is rock. Between Turkey Bridge and Townly's Bridge, the bed of the river, wherever the grade runs below it, is mostly loose earth and sand bars, which, with a little work, will be washed away by the action of the running water when all obstructions below Turkey Bridge have been removed. At Townly's Bridge the grade is forty-one and one-half feet above the datum plane, or one foot below the bed of the channel. From

this bridge to the mouth of Dead River, and on Dead River, to the second bridge, the grade is from one to three feet below the bed of the river.

Dead River and the Passaic, for half a mile below the mouth of Dead River, have at present a *fall* sufficient to carry off the water if the obstructions below were removed, but they are entirely to *shallow*. For this reason it will be desirable to cut them down to the grade line to furnish a channel sufficiently deep to keep the water within its banks and below the surface of the ground. The work of doing this will not be great as the most of it is loose earth, not having had any current to wear it away. From about half a mile below the Church Bridge up to Millington, there is at present a large fall. To drain this valley, then, requires that the bed of the river be cut down to this grade line; and this will necessitate the destruction of Page's Dam and at some future time the lowering of Bunnel's Dam.

When this is done, and only when this is done, the Valley of the Passaic from Millington to Chatham, and also the Valley of Dead River, can be well drained.

The principal cost of this improvement will be in paying for water-power that will necessarily be destroyed.

